Charles Eduardo Snyder

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EXPERIENCE

Institute for Defense Analyses (IDA), Research Staff Member   2008—present
with active SECRET security clearance

Strategy, Forces and Resources Division   *(2012—present)*
Chemical, Biological, Radiological, and Nuclear (CBRN) Analysis Group

Support multiple Department of Defense and Department of Homeland Security agencies:

- Lead the development of analysis tools to enable CBRN hazard plume effects analysis with transport and dispersion models
- Model the spread of contagious disease (Susceptible, Exposed, Infectious, Removed methods)
- Model biological and chemical hazard spread through transit systems (analytic mass transfer approximation methods)
- Use a variety of analysis tools including Python, R, Mathematica, and Java Application Programming Interface hooks to enable data wrangling, software automation, and post-processing analysis

Operational Test and Evaluation Division   *(2008—2012)*

Supported the Director, Operational Test and Evaluation (DOT&E, Department of Defense):

- Represented the director and his deputies in all branches of the test and evaluation acquisition community
- Observed first hand and objectively evaluated operational system tests (primarily Unmanned Aerial Vehicles)—providing my assessment for the director's recommendation to Congress
- Provided technical guidance, support in test planning, and analytic analysis to the acquisition community and Director using a variety of quantitative techniques including Design of Experiments, Reliability Growth, and post-test analysis (e.g. Monte Carlo estimations of equipment availability)

Supported the Director, Office of SAFETY Act Implementation (Department of Homeland Security):

- Provided consolidated technical review and evaluation through a brief to the Director to enable informed decision to grant or deny limited liability status to anti-terrorism technology
- Developed policy and procedure to ensure consistent and unbiased analysis

The Pennsylvania State University   (2003—2008)

Department of Chemical Engineering, PhD Candidate

PhD Thesis—Controlling Colloidal Interactions: Fabrication of Colloidal Assemblies Using Particle Lithography:

- Used of a variety of experimental techniques including nanoparticle synthesis, electron and optical microscopy, nanoparticle and colloidal particle characterization (e.g., surface charge, size distribution), particle isolation with density gradient centrifugation
- Drove experiment through modeling such as Brownian dynamic simulation, numerical analysis of asymmetrically functionalized colloidal interactions (van der Waals, electrostatic, and depletion induced forces), and Green's function use to characterize quorum sensing bacteria

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EDUCATION

The Pennsylvania State University, PhD in Chemical Engineering   **May 2008**
Case Western Reserve University, BS in Chemical Engineering   **May 2003**
Continuous post-graduate development includes:
IDA sponsored education
- Defense and research related: Aircraft Combat Survivability Short Course at the Naval Post Graduate School, DOT&E's Design of Experiments course, Georgia Tech's Basic Radar Concepts course, Defense Acquisition University Acquisition 101
- General leadership and personal development: Tufte's Data Visualization course, IDA task leadership course, DOT&E's Action Officer course, various writing workshops

Other personal development
- Online curriculum including, Stanford's Machine Learning course (by Andrew Ng), Coursera's "Learning How to Learn," various Java, Python, and other programming courses (through Northern Virginia Community College, Coursera, Udacity, etc.)

PUBLICATIONS

Lawrence, Alison E.; Smith, Forrest R.; Vig, John A. and Snyder, Charles E.; "User's Manual for the Chemical and Biological Attack Consequence Estimator Version 1.0" (2016).

Snyder, Charles E.; Grotte, Jeffrey H. and Willert, Jeffrey A.; "(U) Cassandra Homeland Analytic Product Support Technical Summary" (2016).

Smith, Forrest R.; Snyder, Charles E. and Lawrence, Alison E.; "User's Manual for the Hazard Prediction and Assessment Capability Batcher" (2015).

Snyder, Charles E.; Grotte, Jeffrey H.; Lloyd, Don A.; Smith, Monica A. and Yen, Terry A.; "(U) Encapsulation: A Quick-Look Assessment" (2015).

Snyder, Charles E.; Bombardt, John N.; Disraelly, Deena S. and Smith, Forrest R.; "(U) Transit Study Technical Review" (2014).

Yen, Terry A.; Last, Howard R.; Snyder, Charles E.; Demyanovich, James M. and Grotte, Jeffrey H.; "An Analytic Model for Chemical, Biological, Radiological, and Nuclear (CBRN) Requirements Generation for Percutaneous Protection (U)" (2013).

Niles, Michael F.; Demyanovich, James M.; Lloyd, Don A.; Miller, Drew, Platt, Nathan, Schultz, Douglas P.; Snyder, Charles E.; Urban, Jeffry T. and Grotte, Jeffrey H.; "Operational Effects Analytical Support Program (ASP) Long Term Effort—Chemical Biological Force Planning Construct—Phase II" (2013).

Freeman, Laura J.; Wells, Michael C.; Bell, Jonathan L. and Snyder, Charles E.; "Reliability Survey of DOT&E Acquisition Programs" (2013).

Thomas, Dean, Wells, Michael C.; Bell, Jonathan L. and Snyder, Charles E.; "Reliability Survey of DOT&E Acquisition Programs" (2012).

Shaw, Scott E.; Lambrecht, Kristen L; Snyder, Charles E.; "Tactical Unmanned Aircraft System Full-Rate Production Version V Configuration (RQ-7BV1) Limited User Test" (2011).

Snyder, Charles E. and Wells, Michael C.; "Reliability Survey of DOT&E Acquisition Programs" (2009).

Jerri, Huda A.; Sheehan, William P.; Snyder, Charles E.; and Velegol; Darrell, "Prolonging Density Gradient Stability" Langmuir, (April 2010).

Ramírez, Laura M.; Milner, Scott T.; Snyder, Charles E.; Colby, Ralph H.; and Velegol, Darrell; "Controlled Flats on Spherical Polymer Colloids" Langmuir (December, 2009).

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Velegol, Darrell; Shori, Shailesh; and Snyder, Charles E.; "Rayleigh–Bénard Instability in Sedimentation" Industrial & Engineering Chemistry Research, 48(5), 2414-2421 (2009).

Snyder, Charles E.; Ong, Melissa; and Velegol, Darrell; "In Solution Assembly of Colloidal Water" Soft Matter, 5, 1263-1268 (2009).

Parent, Mary E.; Snyder, Charles E.; Kopp, Nathaniel; and Velegol, Darrell, "Localized Quorum Sensing in Vibrio fischeri" Colloids and Surfaces B, 62, 180-187, (2008).

Yake, Allison M.; Snyder, Charles E.; and Velegol, Darrell; "Site-Specific Functionalization on Individual Colloids: Size Control, Stability and Multi-Layers" Langmuir, 23, 9069-9075 (2007).

Yake, Allison M.; Panella, Rocco A.; Snyder, Charles E.; and Velegol, Darrell. "Fabrication of Doublets by a Salting Out-Quenching-Fusing Technique." Langmuir, 22, 9135-9141 (2006).

Snyder, Charles E.; Yake, Allison M.; Feick, Jason D.; and Velegol, Darrell; "Nanoscale Functionalization and Site-Specific Assembly of Colloids by Particle Lithography." Langmuir, 21, 4813-4815 (2005).

Jones, Joseph F.; Holtzer, Gretchen L.; Snyder, Charles E.; Yake, Allison M.; and Velegol, Darrell; "Charge Nonuniformity Light Scattering." Colloids and Surfaces A, 267, 79-85 (2005).

PATENT

Velegol, Darrell; Feick, Jason D.; Yake, Allison M.; Snyder, Charles E.; "Particle lithography method and ordered structures prepared thereby." U.S Patent application PST-14302/36 (2005).

PRESENTATIONS

Snyder, Charles E.; Grotte, Jeffrey H.; Demyanovich, James M.; November 2016. Use of Modeling in Table-top Exercise Support. MORS Wargaming Symposium, Alexandria VA.

Snyder, Charles E.; Velegol, Darrell; June 2005. Nanoscale Functionalization and Site-Specific Assembly of Colloids by Particle Lithography. 79th ACS Colloid and Surface Science Symposium, Potsdam, NY.

Snyder, Charles E.; Velegol, Darrell; October 2006. Site Specific Functionalization of Colloids. The Pennsylvania State University Chemical Engineering Department Symposium. University Park, PA.

Snyder, Charles E.; Velegol, Darrell; June 2005. In-solution Directed Assembly of Heterogeneous Colloidal Aggregates. 233rd American Chemical Society National Meeting, Chicago, IL.

TEACHING AND OTHER SERVICE

- **(2017)** Demonstrated and presented on the inner-workings of a home-build 3D printer at the Institute for Defense Analyses Science Fair for students of all ages
- **(2008-present)** Tutor college-bound students in math, physics, and chemistry through the Building Better Futures program—partnered with the Alexandria, Virginia public school system
- **(2014)** Designed and taught a 40-hour summer course for the Joint Science and Technology Institute—exposing college-bound students to basic programming (spreadsheet- and Python-based), statistics (to include bootstrapping), calculus, and transport and dispersion phenomena (see https://github.com/csnyd/Public2016/—JSTINotes.xlsx for curriculum notes and LinkToBootstrappingTutorial.txt for sample lecture)
- **(2007)** In addition to graduate teaching assistant responsibilities, through the Graduate Teaching Fellow Award at the Pennsylvania State University: co-taught "Biomedical Separation" under the Chemical Engineering department head